

Claims

1. An air treatment system for a vehicle, in particular a motor vehicle,
 - 5 - having a ducting system (2) for directing a current of air (17), which has at least one fresh air inlet opening (6) that communicates with the surroundings (7) of the vehicle and/or at least one inlet opening for recirculated air that communicates with an interior (9) of the vehicle
10 which is to be air-conditioned, and at least one outlet opening (10) that communicates with the vehicle interior (9),
 - 15 - having an oxidation device (41) which functions electrically and breaks down odorous substances and/or pollutants contained in the current of air (17) by oxidation.
2. The air treatment system as claimed in claim 1,
20 **characterized in that** the oxidation device (41) has at least one ozone generator (22,23) for generating ozone in the current of air (17).
3. The air treatment system as claimed in claim 2,
25 **characterized in that** the ozone generator (22,23) is designed so that in operation it only generates just enough ozone to ensure that, even if there are no odorous substances or pollutants in the current of air (17) or no microorganisms present on the surfaces
30 exposed to the current of air (17), the surfaces on which the current of air (17) impinges are sufficiently large to bring about a breakdown of the ozone thereon which will reduce the ozone content of the current of air (17) to or below a predefined limit
35 before the current of air (17) enters the vehicle interior (9) through the outlet openings (10).

4. The air treatment system as claimed in claim 2 or 3,
characterized in that at least one catalyzer (25),
which breaks down the ozone contained in the current
of air (17), is arranged downstream of the ozone
generator (22,23).
5. The air treatment system as claimed in claim 4,
characterized in that the catalyzer (25) takes the
form of a sorption catalyzer.
6. The air treatment system as claimed in claim 4 or 5,
characterized in that the air treatment system (1) may
be operated in a purification mode in which the ozone
generator (22) is active and enriches the current of
air (17) with ozone, the current of air (17) in the
purification mode being directed so that the entire
current of air (17) reaching the outlet opening(s)
(10) first flows through the catalyzer (25).
7. The air treatment system as claimed in any one of
claims 2 to 6, **characterized in that** the air treatment
system (1) may be operated in a sterilization mode in
which the ozone generator (22,23) is active and
enriches the current of air (17) with ozone, a first
baffle device (26) being provided, which in the
sterilization mode directs the current of air (17) so
that no ozone-charged air enters the vehicle interior
(9) through the minimum of one outlet opening (10).
8. The air treatment system as claimed in claims 6 and 7,
characterized in that a first ozone generator (22) is
provided, which is arranged upstream of the catalyzer
(25) and is active in the purification mode, and in
that a second ozone generator (23) is also provided

which is arranged downstream of the catalyzer (25) and is active in the sterilization mode.

- 5 9. The air treatment system as claimed in claims 6 and 7 and claim 4, **characterized in that** a common ozone generator (22) is provided for the purification mode and the sterilization mode, it being possible to deactivate the catalyzer (25) for the sterilization mode.
- 10 10. The air treatment system as claimed in claim 9, **characterized in that** a second baffle device (37) is provided, which in the sterilization mode directs the current of air (17) so that this completely or
- 15 substantially bypasses the catalyzer (25).
11. The air treatment system as claimed in claim 9, **characterized in that** the catalyzer (25) can be switched between an active position assigned to the
- 20 purification mode, in which the catalyzer (25) projects into a flow path (32) of the ozone-enriched current of air (17) and through which the latter flows, and a passive position assigned to the sterilization mode, in which the catalyzer (25) is
- 25 completely or substantially removed from the flow path (32) and is entirely or substantially bypassed by the ozone-enriched current of air (17).
12. The air treatment system as claimed in any one of
- 30 claims 7 to 11, **characterized in that** the first baffle device (26) has a switch element (27), which is arranged upstream of a distributor chamber (16), from which the conditioned current of air (17) is directed to at least one outlet opening (10), and which in the
- 35 sterilization mode shuts off the air supply to the distributor chamber (16).

13. The air treatment system as claimed in any one of claims 7 to 11, **characterized in that** the first baffle device (26) has a separate switch element (27) for each outlet opening (10), which in the sterilization mode shuts off the air supply to the respective outlet opening (10).
14. The air treatment system as claimed in claim 12 or 13, **characterized in that** in the sterilization mode the switch element (27) opens an outlet air path (30), which directs the current of air (17) into the surroundings (7) of the vehicle and/or returns it into the ducting system (2) upstream of the blower (3), the switch element (27) closing the outlet air path (30) in normal operation of the air treatment system (1).
15. The air treatment system as claimed in any one of claims 1 to 14, **characterized in that** the oxidation device (41) has at least one photocatalyzer device (43), which comprises at least one UV-emitter (44) and at least one catalyzer (45) in the form of a photocatalyzer and which causes UV radiation to act upon at least one photocatalyzer (45) in order to oxidize the odorous substances and/or pollutants.
16. The air treatment system as claimed in claim 15, **characterized in that** the photocatalyzer (45) takes the form of an oxidation catalyzer.
17. The air treatment system as claimed in any one of claims 4 to 16, **characterized in that** the catalyzer (25) is integrated into an existing component (2,3,4,5) of the air treatment system, this component being exposed to the current of air (17) and/or having the current of air (17) flowing through it.

18. The air treatment system as claimed in claim 17,
characterized in that the catalyzer (25) is integrated
into a blower (3) for generating the current of air
(17), and/or into a heating device (5) for heating the
current of air (17), and/or into the cooling device
(4) for cooling the current of air (17) and/or into at
least one wall section of the ducting system (2).
19. The air treatment system as claimed in claim 17 or 18,
characterized in that the integration of the catalyzer
(25) into the respective component (2,3,4,5) is
achieved
- in that a surface of the respective component
(2,3,4,5) exposed to the current of air (17) is
coated with a suitable catalytic material and/or
 - in that the respective component (2,3,4,5), at
least in an area exposed to the current of air
(17), is composed of a suitable catalytic
material.
20. The air treatment system as claimed in any one of
claims 4 to 19, **characterized in that** the catalyzer
(25) is arranged upstream of a distributor chamber
(16), from whence the conditioned current of air (17)
is directed to at least one outlet opening (10).
21. Use of an electrically functioning oxidation device
(41) in an air treatment system (1) of a vehicle, in
particular a motor vehicle, for breaking down odorous
substances and pollutants by means of oxidation in a
current of air (17), which is directed from the air
treatment system (1) into an interior (9) of the
vehicle.

22. Use of an electrically functioning oxidation device (41) in an air treatment system (1) of a vehicle, in particular a motor vehicle, for sterilizing components (2,3,4,5) of the air treatment system (1) which are exposed to a current of air (17), which in normal operation is directed from the air treatment system (1) into an interior (9) of the vehicle.
23. The use as claimed in claim 21 or 22, **characterized in that** the oxidation device (41) has at least one ozone generator (22,23) for generating ozone in the current of air (17).
24. The use as claimed in claim 21, **characterized in that** the oxidation device (41) has at least one photocatalyzer device (43), which comprises at least one UV emitter (44) and at least one catalyzer (45) in the form of a photocatalyzer and which causes UV radiation to act upon the at least one photocatalyzer (45) in order to oxidize the odorous substances and/or pollutants.